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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,522	07/11/2003	Tom Etheridge	200210053-1	5065
22879 7590 10/29/2008 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400				
EXAMINER				
TALBOT, BRIAN K				
ART UNIT		PAPER NUMBER		
1792				
NOTIFICATION DATE		DELIVERY MODE		
10/29/2008		ELECTRONIC		

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOM ETHERIDGE

Appeal 2008-3769
Application 10/618,522
Technology Center 1700

Decided: October 27, 2008

Before CHUNG K. PAK, CHARLES F. WARREN, and
KAREN M. HASTINGS, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 9 through 25, and 35, all of the pending claims in the above-identified application. We have jurisdiction pursuant to 35 U.S.C. § 6.

We REVERSED.

STATEMENT OF THE CASE

The subject matter on appeal is directed to “forming conductive patterns using ink-jet technology” (Spec. 1, ll. 9-11). Details of the appealed subject matter are recited in representative claim 9 reproduced below¹:

9. A method of forming an electrically conductive pathway, comprising steps of:
- a) jetting a first ink-jetable composition onto a substrate, said first composition including a first liquid vehicle and palladium aliphatic amine complex solvated therein;
 - b) overprinting or underprinting a second composition with respect to at least a portion of the first ink-jetable composition to form a predetermined pattern, said second composition including a second liquid vehicle and reducing agent solvated therein; and
 - c) applying heat to the predetermined pattern sufficient to cause reaction between the reducing agent and palladium aliphatic amine complex to form palladium metal without substantially altering the substrate.

As evidence of unpatentability of the claimed subject matter, the Examiner has proffered the following evidence:

Tuttle	US 3,896,252	Jul. 22, 1975
Gedrat	US 4,285,991	Aug. 25, 1981
Miller	US 4,668,533	May 26, 1987

The Examiner has rejected claims 9 through 25 and 35 under 35 U.S.C. § 103(a) as “unpatentable over the combined disclosures of Miller and either Tuttle or Gedrat.

¹ We will address the individual claims on appeal separately to the extent that they have been substantively and separately argued consistent with 37 C.F.R. § 41.37(c)(1) (vii) (2005).

Appellants appeal from the Examiner's decision rejecting the claims on appeal under 35 U.S.C. § 103(a).

RELEVANT FACTUAL FINDINGS

The following factual findings are supported by a preponderance of the evidence.

1. Miller teaches a process for manufacturing a printed circuit board, wherein an ink containing a sensitizer, which is a reducing agent, is applied on a substrate, such as a molded polymer, in a desired pattern via ink jet process, the sensitized substrate is treated with a metal containing activator, which can be a palladium salt, and a metal is deposited on the pattern via electroless plating to form the circuits (col. 2, l. 40 to col. 3, l. 33).
2. Miller teaches that upon reducing the palladium salt, it serves as a catalyst for subsequent deposition of metals having more positive reduction potentials (col. 3, ll. 9-13).
3. Miller does not specifically mention the claimed palladium aliphatic amine complex as it's a palladium salt (col. 1 to col. 6).
4. Tuttle teaches a process for improving "adhesion between the plastic and the metallic layer deposited thereon..." in a plating process involving aminating the surface of the plastic to be metallized with ethylenediamine or 1, 3-diaminopropane, treating the aminated surface with a noble metal salt, which can be a palladium salt and a complex metal salt such as diamine silver (I) nitrate, and treating the surface with a reducing agent to produce a metallized surface having a resistance of about 100 ohms/sq. or less (col. 1, ll. 32-58 and col. 4, ll. 11-25).
5. Tuttle teaches a process employing a particular plastic (polymer)

“prepared by polymerizing an unsaturated carboxylic acid or anhydride with one or more copolymerizable monomers in the presence of rubber (col. 2, ll. 14-18).

6. Tuttle teaches that “[a]mination of the surface forms salts of the acid groups and halfamide and/or halfamide salts of the anhydride groups (col. 3, ll. 25-27).

7. Tuttle teaches that “the surface to be metallized is usually rinsed after each of the process steps and that each step require[s] only a few minutes” (col. 3, ll. 28-30 and col. 4, ll. 11-15).

8. Gedrat teaches etching, purifying, activating, and reducing the surface of a conventional basis plate of epoxy resin coated with copper on both sides and reinforced with glass fibers to form a printed circuit (col. 5, ll. 10-40).

9. Gedrat teaches employing an activated solution of “palladium complex like, for example palladium sulfate in 2-aminopyridine which complex is then reduced through exposing to a reducing substance like...” (col. 4, ll. 54-57 and col. 1, ll. 35-40).

PRINCIPLES OF LAW

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). “[A]nalysis [of whether the subject matter of a claim would have been obvious] need not seek out precise teachings directed to the specific subject matter of the challenged

claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). Nevertheless, “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR* at 1741-42, *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

ISSUE, ANALYSIS, AND CONCLUSION OF LAW

Appellant does not dispute the Examiner’s finding that Miller teaches a process for manufacturing a printed circuit board, wherein a sensitizer containing a reducing agent and an activator (palladium salt) are applied on a substrate, such as that made of polymer, in a desired pattern via ink jetting prior to subsequent deposition of metals on the pattern via electroless plating to form the circuits. (*Compare* Ans. 3-4 *with* App. Br. 10-25 and Reply Br. 10-16; *see also* FF 1-2). Rather, Appellant contends that one of ordinary skill in the art would not have been led to employ the claimed palladium aliphatic amine complex in Miller’s process for ink jet printing of metal-image formation in the manufacture of printed circuit boards (App. Br. 10-25 and Reply Br. 10-16)

Therefore, the dispositive question is: Has the Examiner’s supplied sufficient evidence to support his determination that one of ordinary skill in the art would have been led to employ the claimed palladium aliphatic amine complex in Miller’s process for ink jet printing of metal-image formation in the manufacture of printed circuit boards? On this record, we answer this

question in the negative.

As indicated *supra*, Tuttle teaches aminating the surface of a particular thermoplastic substrate with a solution of ethylenediamine or 1, 3-diaminopropane, rinsing the surface of the particular thermoplastic substrate after the amination, and treating the aminated surface with a noble metal salt or a complex noble metal salt and then with a reducing agent to improve adhesion between the thermoplastic substrate and a metallic layer deposited thereon (FF 4, 5, and 7). According to Tuttle, the purpose of amination of the surface of the particular thermoplastic substrate is to form “salts of the acid groups and halfamide and/or halfamide salts of the anhydride groups” (FF 6). Tuttle does not teach employing the claimed palladium aliphatic amine complex as an activating agent (FF 4-7). Nevertheless, the Examiner takes the position that based on Tuttle’s separate employment of a palladium metal salt and a solution of ethylenediamine or 1, 3-diaminopropane, one of ordinary skill in the art would have been led to employ a mixture a palladium metal salt and a solution of ethylenediamine or 1, 3-diaminopropane, which according to the Examiner, would necessarily result in the claimed palladium aliphatic amine complex (Ans. 6). However, as correctly pointed out by Appellant (App. Br. 21 and Reply Br. 13), the Examiner has not supplied any explanation, much less evidence, to show why one of ordinary skill in the art would have reasonably expected that such complex, were it to inherently form, would still be useful for aminating the thermoplastic surface as required by Tuttle. Thus, on this record, we determine that the Examiner has not supplied sufficient reasoning and evidence to show that one of ordinary skill in the art would have been led to

employ a mixture a palladium metal salt and a solution of ethylenediamine or 1, 3-diaminopropane or the claimed palladium aliphatic amine complex in Miller's process for ink jet printing of metal-image formation.

We also determine that Gedrat does not remedy the deficiencies of Miller and Tuttle. Gedrat teaches an activated solution of "palladium complex like, for example palladium sulfate in 2-aminopyridine which complex is then reduced through exposing to a reducing substance like..." in forming a printed circuit (FF 8-9). Gedrat does not identify its palladium complex as including the claimed palladium aliphatic amine complex (*id*).

Under the above circumstances, we concur with Appellant that the Examiner has not demonstrated that one of ordinary skill in the art would have been led to employ a mixture a palladium metal salt and a solution of ethylenediamine or 1, 3-diaminopropane (the claimed palladium methyl diamine) in Miller's process within the meaning of 35 U.S.C. § 103 (a).

ORDER

For the reasons set forth above, the decision of the Examiner is reversed.

REVERSED

tc

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